Three Examples of Multi-agent Systems Research

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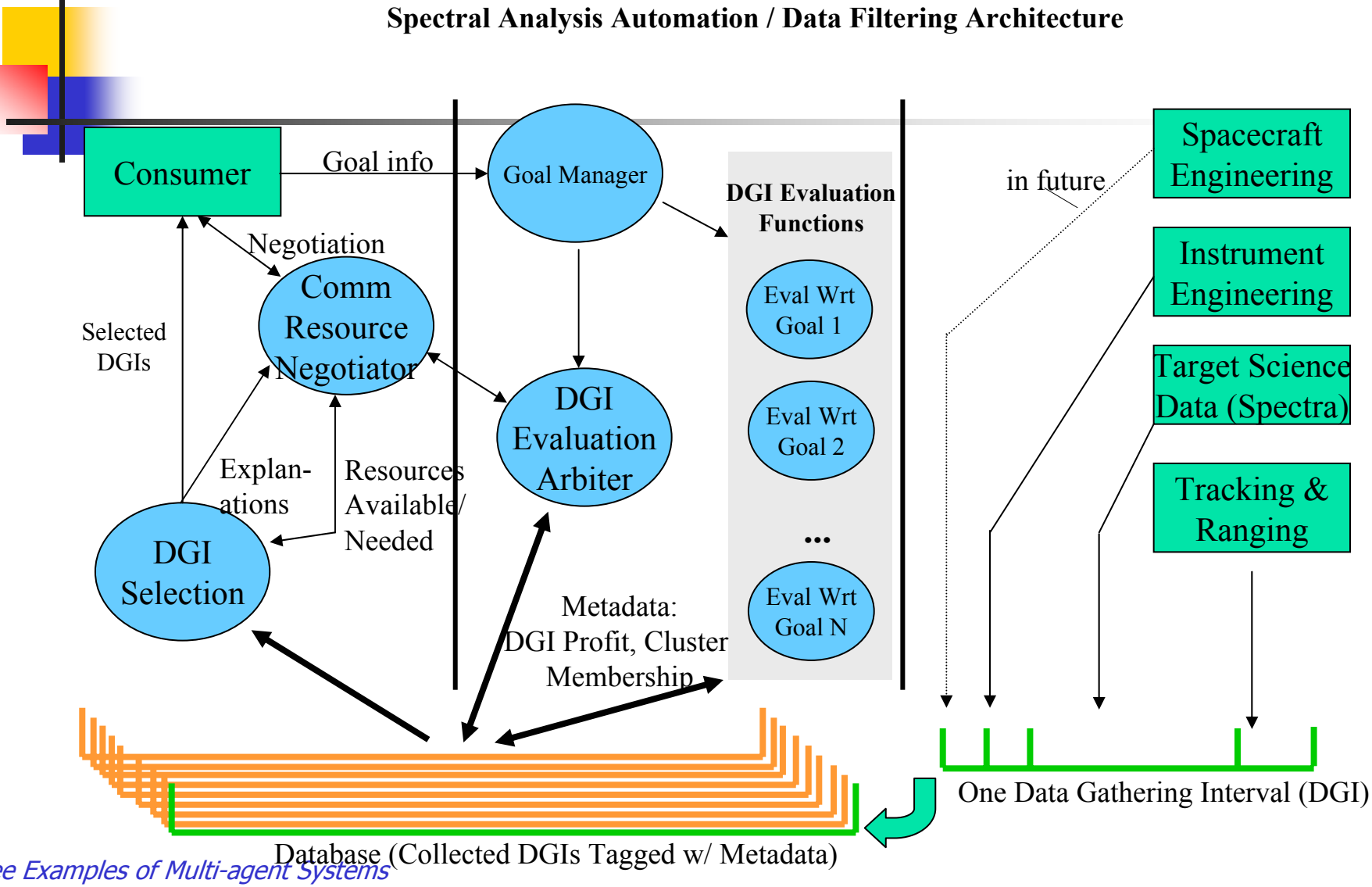
Goals, Objectives, Benefits

- The purpose of the multi-agent research is to more clearly understand the applicability of this technology in different domains. Currently we are considering:
  - **Progressive Autonomy**– a multi-agent system supporting progressive autonomy for ground-based and/or on-board spectral data processing
  - **Autonomic Systems** – a multi-agent system approach for realizing autonomic properties in mission operations systems
  - **Electronic Training** – a multi-agent system providing an intelligent interface for student monitoring and tutorial text management

Spectral Analysis Automation - SAA



Spectral Analysis Automation - SAA

- A prototype of the SAA has been developed.
  - The testbed for the prototype is the library of spectral images from the NEAR spacecraft
- The study of a future testbed consisting of a community of robotic devices for lunar exploration is commencing.
- A study of progressive autonomy, based on SAA ideas, has commenced

Autonomic Computing

- A System S is autonomic if:
  - it has knowledge of itself, in terms of resources and capabilities
  - it has the ability to configure and reconfigure itself
  - it has the ability to continuously self-optimize itself
  - it has self-healing capabilities
  - it has self-protection capabilities
  - it has the ability to discover knowledge of its environment and context and adapt accordingly
  - it has the ability to function in a heterogeneous environment
  - it has the ability to anticipate and adapt to user needs

Autonomic Computing (Cont'd)

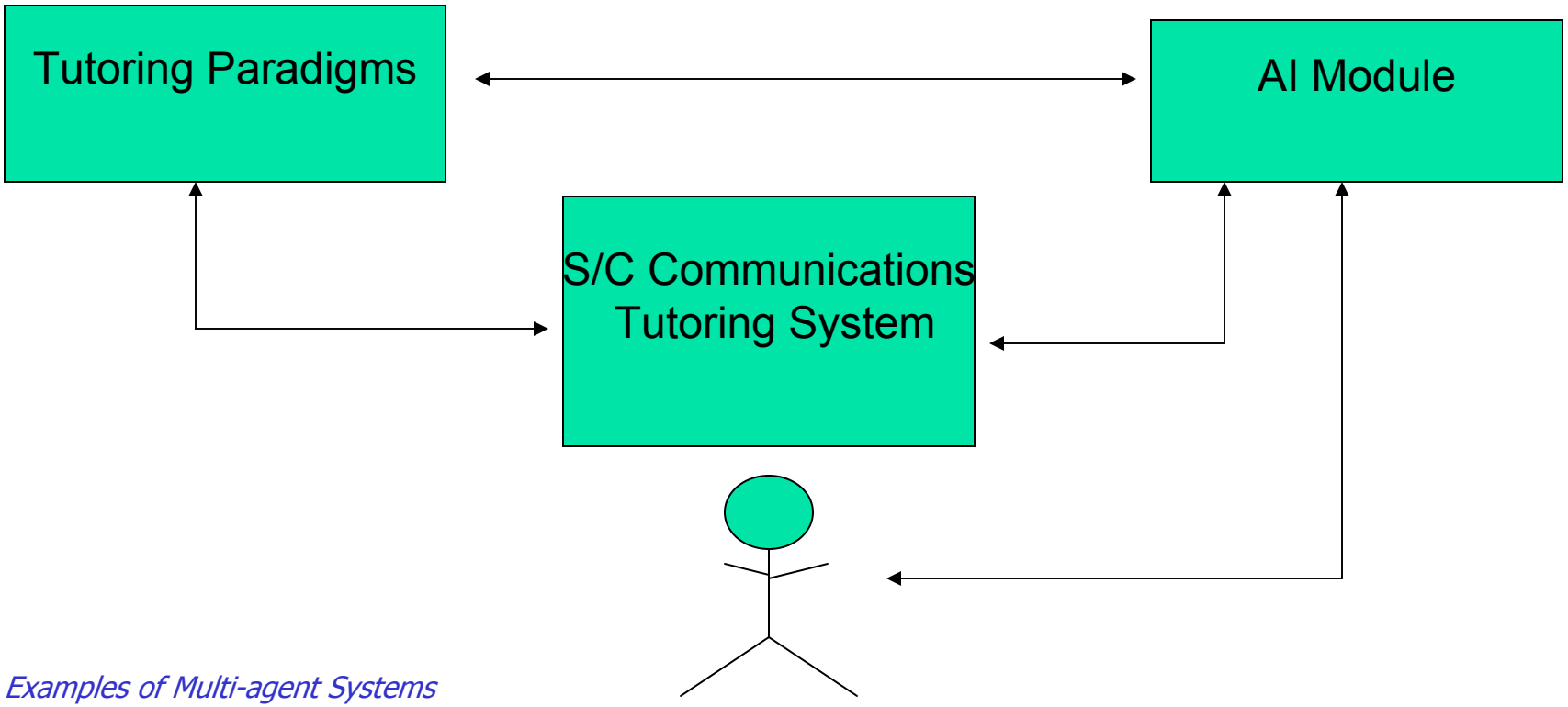
- Current Status:
  - Have entered into a collaborative agreement with IBM and GMSEC to investigate the applicability of autonomic principles in ground control systems
  - Have developed, with the support of WPI students, a prototype demonstrating selected autonomic capabilities
  - Have commenced discussions with IBM Research on the application of autonomic capabilities in fault detection and isolation systems

Autonomic Computing (Cont'd)

- Work will continue with IBM for the possible application of autonomic system principles to both GMSEC ground system infrastructure and operations and for fault detection and isolation systems.

Web-based Intelligent Tutoring System (WITS)

- Four major components of WITS



Web-based Intelligent Tutoring System (WITS) (Cont'd)

- Work on the development of WITS, in conjunction with Southeastern University (SEU) in Washington, DC, has just commenced.
  - Focus of the WITS will be ground/spacecraft communications